

FORESTRY.

The following is the able and interesting prize essay of Mr. P. E. Bucke, of Ottawa, which was read at the recent meeting of the Ontario Provincial Agricultural Association at London, Ont. :—

In the earlier days of the Province of Ontario (Upper Canada), if anyone had argued restriction on the destruction of timber, he would have had few to listen to him. Amongst the earlier settlers the destruction of trees was looked upon as one of the cardinal virtues. The superabundance of timber led to this state of things, and it is now found difficult to check the rapid wasting away of our forests.

Fifty years ago the trees standing in and around your "Forest City" were the admiration of strangers. Mr. J. C. Loudon, writing at the date referred to, states that "The white pine near New London has a trunk varying from thirteen to eighteen feet in circumference, and some trees which had been blown down were measured and found to average one hundred and sixty feet in length. The oaks varied from ten to fifteen feet round the trunk, with fifty feet of clear stem. Mixed with these were beeches, birches and ashes. Horizontal sections of white pine and hemlock spruce exhibited between 300 and 400 annual rings; oaks, 200; elms, 300." The memory of the writer reaches nearly back to the time and place referred to when, in the language of the American poet :—

"His echoing axe the settler swung,
Amidst the scallie solitude,
And crashing, thundering, down were flung,
The Titans of the wood."

When the pioneer looks back, what changes present themselves in the past fifty years. The goose which laid the golden egg is being rapidly strangled, and it is now declared by people best able to judge that the work of wholesale destruction of the forests of the country is being carried on without any new growth of timber being produced to take the place of that removed. The Government, which has for a long time lain in a partially dormant condition with regard to this subject, is now awakening from its lethargy, and it is trusted that this immense industry, second only to agriculture in this Province, will at length receive the attention its magnitude deserves.

The subject is a practical one, and must be approached in a practical way. Besides the use of trees for timber, it is now generally conceded that they have certain influences which assist in the harmonizing of the laws of nature. For instance, trees, by the absorption of carbonic acid gas, and emission of oxygen, assist in purifying the air we breathe. By interposing their foliage between the sun and the earth, they shelter the latter and equalize the temperature of earth and air. They cover the earth with leaves which, when decayed, make a most nutritious soil, and in the meantime guard against a too rapid evaporation of water. Trees also serve to protect both the ground and human habitations from cold and destructive winds. The evaporation from their leaves by cooling the atmosphere has the effect of increasing the frequency of showers, and also assists in the precipitation of dew. In will be seen in the manner above described that forests subserve a most beneficial purpose. Apart, however, from these considerations, and their utilitarian, or revenue producing qualities, trees are the most majestic and imposing of nature's vegetable kingdom, and no view, in any country, is an object of beauty without them. It is noticed in the report of the Commissioner on Agriculture, just issued, that the County of Kent is beginning to decorate its roadways by the planting of trees. Nothing can show a higher state of civilization, or a greater love of the beautiful, than tree growing for agricultural purposes. But besides harmonizing the influences of nature, and adding their graceful forms to the grandeur of the landscape, there is a wealth in trees which few can realize who have not had some share in the export timber trade of this country. In 1872 circulars were prepared and sent to all mill owners and others in Ontario to ascertain the amount of timber cut. When the returns were received, square timber, logs, deals, &c., were reduced to board measure, and the estimate based on these returns showed a production of 750,000,000 feet, and it was calculated that of this quantity from 85 to 87 per cent.

was exported, and the balance used in the country. The produce of the forests of Ontario since then are supposed to have declined.

The revenue derived from timber by the Crown Lands Department of this Province averages nearly \$400,000 per annum, and the latest returns give an area of a little over 16,000 square miles of territory under license to parties for cutting timber.

The actual amount of timber in Ontario and the territory covered by it is a subject of the utmost importance, as the wealth of this Province, like most other new countries, is represented, not so much by its manufactures as by the product of the soil, and these are derived from three sources, namely, agriculture, mines, and forests.

The enormous waste of timber by bush fires is quite incredible to those who have not witnessed the devastation of pine lands by this destructive element. These originate through careless settlers, hunters who camp in the woods, and sometimes, though rarely, by the lumbermen themselves, or by surveyors who make smudges to ward off the attacks of flies and mosquitoes. These fires, started during a dry season, are only stopped by large streams, lakes, swamps, or by heavy and continuous rains, and are much more destructive than the shantymen's axe, because where the latter culls the good timber and leaves the small trees for future years, the former destroys both timber and soil, leaving a barren waste, the pine being usually replaced by a scrub growth of birch and poplar. Stringent laws have been passed by the Ontario Legislature against the originators of these fires, but unfortunately no sufficient machinery has been organized to put these laws in force, though petitions from time to time have been forwarded to the Local Government by the mill owners and lumbermen, who are in every way interested in their suppression. It is estimated that more timber has been destroyed by bush fires than has been exported altogether from this country.

It is evident that if these fires could be suppressed, and the young trees which are left on the pine lands after the large timber has been cut out, could be protected and allowed to grow up, a valuable basis would be formed for a continuous supply. If to this were added some systematic scheme by the Government for planting on its waste lands, it is not yet too late to recuperate the pine timber forests of the country. To further the proposed undertaking, it would be well to import a few practical foresters, in order that their accrued wisdom in the Old World might be utilized in the New. A portion of the revenue derived from the Crown Lands by the Government would be profitably expended in fostering and protecting the timber interests on the public domain, and if the present dues are not sufficient to meet the necessary demands, they should be increased. (Power for this purpose is given in the 1st section of an Act respecting Timber and Public Lands. Chap. 26, Con. Statutes of Canada, Section 1).

Under the direction of the Commissioner of Crown Lands, there is at present a system of wood rangers, which consists of a staff of twenty or thirty experienced and reliable rangers, engaged from December to the end of April, with some of the party continued to the end of October. The employment of these individuals has been very satisfactory, swelling the revenue in some instances 50 per cent., and in one agency 400 per cent. These rangers have standing instructions to report on any special waste, and amongst other things to see that any timber, which has been killed by fire running through it, is utilized before the borer has destroyed the wood. Although their visits through the bush have been of great service to the Government, it is obviously impossible for this small staff of partially employed men, and that at a time of year when fires of a serious nature never occur, to ascertain the origin of the destructive conflagrations which visit the pineries, or to look as sharply after the interests of the Government as is necessary. The writer would therefore respectfully suggest that the Government should appoint permanently the required number of wood rangers, or inspectors, and that one or more constables be employed for every 100 square miles, whose duty it should be to appro-

hond and report to the ranger, or other officer, any causes of violation of the Crown Timber regulations, and especially with regard to fires, the officer in charge being authorized to examine under oath, and prosecute parties offending against the Land Act. At present the regulations are good, but as there is no one specially, beside the rangers, to enforce them, and as these are so few and spread over so large a territory, besides which they are not employed continuously, the Government therefore can hardly expect that careful supervision which the country has a right to demand for the revenue obtained.

With regard to the replanting of trees as a means of continuing the timber supply, the Commissioner of Crown Lands, writing in 1877, says that "It is of course known that on the continent of Europe, where forests are in the hands of the Government (as they are in Ontario), the cutting down of trees is rigidly regulated and restricted, a system of yearly planting being closely adhered to. The same practice is followed in Britain, where forests are chiefly in the hands of private individuals, but in those countries the population is at a maximum, and is maintained at that point. No encroachments on the forest lands are deemed necessary, whereas, in Ontario, a vast yearly influx is continually pressing into the lands of the Crown, before which the forests must in the meantime yield, whatever steps may be deemed necessary to restore them in the future." The writer must dissent somewhat from the theory laid down, and would suggest that millions of acres of pine lands are practically unsuited for agriculture, and therefore worthless for settlement, and it is the manifest duty of the Government, as holding the land in trust for the people, to see that these tracts are protected in such a way that the young timber is allowed to take the place of that cut, and that they be guarded against bush fires and promiscuous pillage. With regard to the preservation and culture of pine timber, it is absolutely necessary, owing to the large area required for its growth, and the time it occupies in attaining a suitable size for the purposes for which it is used,—say from 80 to 150 years, if produced from the cone,—that the Government must be the producer, cultivator, and protector. No individual could acquire the thousands of square miles which would be needed, nor could any family or company afford, as an investment, to await the period when the greater revenue from large timber would be derived. But the greatest obstacle to a private scheme of this kind would be the danger of throwing so large a monopoly of timber and territory into private hands. The Government, by the retention of certain districts, and the appointment of competent foresters and constables, could guard, plant and protect any sized domain, and it is believed would be enabled to secure a paying revenue from the timber grown. It is therefore suggested, 1st, that pine timber lands should not be subject to entry and preemption or homestead laws; 2nd, that the lands now known as "Government Pine Timber Lands" should be surveyed and appraised at their approximate value; 3rd, that exports be directed to ascertain,—if it is not already known to the Government,—the pine lands area in Ontario.

With regard to the cost of producing timber, it is stated in the report on Swedish forest culture that in the northerly part of Sweden it requires two and three hundred years for trees to attain their full size, whilst in the southern part of the country one hundred years was found sufficient. Estimating, therefore, our pine lands at one dollar per acre, allowing 100 years for the timber to grow, and interest at the rate of 5 per cent., which would double the principle every 20 years, the result would be that at the end of the time specified (160 years), the timber would cost \$256 per acre. The writer believes this statement to be a very accurate one. It does not take into consideration the further cost of fencing and taxes, and the wages for the further supervision of the estate, whilst on the other hand the thinnings from time to time would pay a small percentage, probably enough to clear all charges for interest, etc. The lakes and streams enclosed might also be protected, and together with the forests, could be made to yield a revenue from the fish and game produced in them.

In Sweden the pine and spruce lands are never entirely cleared. From six to seven seed trees are left on every quarter acre until the young plants begin to grow up. In five or six years these are removed.

With respect to the encouragement of tree planting, the neighboring republic has given great attention to the subject, and has endeavored to promote it by premiums, by reduction or remission of taxes, and on prairie lands, the actual right to so many acres, without money payment, provided a certain number of trees are planted and cared for, and in various ways the state has tried to stimulate arboriculture, but the result has not been such as to warrant imitation on the part of Ontario. Practical papers on forestry, published in farming journals and such others as chiefly circulate amongst the rural districts, to popularize the movement, and plantations made of our various native and selected foreign forest trees, on such Government properties as the Experimental Farm, Guelph, the Asylum enclosures, public school yards, such exhibition grounds where fairs are held (where tree protectors could also be shown), would go far to represent in a practical way how the general appearance of our country could be improved, adorned and beautified, at little cost. Trees for this purpose should be correctly and neatly labelled, giving age, the date of transplanting, as well as the common and botanical name of the specimen, and its native habitat, if of foreign origin, etc. A few ac planted here and there would soon convince farmers and others that there is money in the business, as well as beauty, besides an advanced price added to farm lands. With such facts before them, men would be found willing and ready to invest in this enterprise, and also to adorn their farms and home surroundings.

Mr. Hotchkiss, who compiled the lumber article for the last United States census, states that the timber supply in Michigan is not over twenty-nine billions of feet, and that the ordinary quantity annually cut diminished the supply at the rate of six billions of feet per annum, which will use up these forests in eight years. The State of Wisconsin, he estimates, has forty-nine billions of feet of standing pine and Minnesota six billions, one hundred and fifty millions, but the supply is fast diminishing. He also estimates that at the present rate of cutting the Canadian supply will give out about the same time as that of the United States, say thirty or forty years hence, at the utmost limit. The lumber trade of the continent will then be transferred to the Pacific slope. One of the largest saw mill owners on the Ottawa informs the writer that he does not think there will be any pine to cut for exportation from Canada twenty years hence. Should this Province, therefore, wish to retain her timber interests, there should be no delay in dealing with the question in some practical way.

It may be stated that there is a very strong feeling amongst the lumbermen and mill-owners on the Ottawa and elsewhere that the Government should survey and inspect all the pine timber lands, and ascertain as far as possible what is worthless for cultivation, and absolutely exclude settlers and squatters from these tracts. In making such an examination the character of the soil should be carefully and thoroughly made known, as the surface of the ground is usually covered with a thin coating of good soil, owing to the decaying of the leaves from previous years, which will only raise one, two, or at the most three crops, thereby exhausting this thin skin of earth, so that nothing further will grow upon it. In the meantime the burning of the rubbish off this worthless plot has endangered, if it has done nothing more, millions worth of property.

Again, it is a difficult matter for parties holding license claims over a large territory to dispossess squatters, as these people, who have nothing to lose, and who are possessed of the means of making a fire, could avenge themselves to an alarming extent. It is believed that if the Ontario Government could make the people aware of the value of the pine timber, and the necessity there is for protecting it, they (the Government) would be largely sustained in passing and carrying out the most stringent laws for the exclusion of parties liable to injure